

CLAIMS

1. Method for handling microparticles, c h a r a c t e r i s e d in, that at least two treatment steps are performed in the same vessel without moving the particles to another vessel.

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2. Device for handling microparticles, c h a r a c t e r i s e d in, that there are organs in the device for changing the solution in such a manner, that at least two treatment steps may be performed for microparticles in the same vessel without moving the particles to another vessel.

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AMENDED CLAIMS

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original claims 1 and 2 replaced by new claims 1-21 (5 pages)]

1. A method for handling microparticles, where the microparticles (22) are used as the solid phase to bind the desired component from the sample, such as various biomolecules,
5 Nucleic Acid, protein, peptide, cell organelles, bacteria, cells or viruses,
c h a r a c t e r i s e d i n, that
- at least two treatment steps of the microparticles (22) or magnetic particles, such as ferromagnetic, paramagnetic or superparamagnetic particles are performed in the same vessel (26) without moving the particles to another vessel,
 - 10 - which treatment steps are at least one change of solutions (23) and at least one mixing.
2. A method according to claim 1, c h a r a c t e r i s e d i n, that
- microparticles (22), such as magnetic particles are treated by a magnetic tool (10) equipped with an elastomer shield (21),
 - 15 - in the vessel (26) the microparticles (22) are collected and bound on the elastomer shield (21) of the magnetic tool (10) during the change of solutions (23),
 - the microparticles (22) are mixed by means of a tool, such as the magnetic tool (10), so that the elastomer protective membrane of the tool is moved in the solution (23).
- 20 3. A method according to claim 1 or 2, c h a r a c t e r i s e d i n, that
- during the change of solutions (23) the microparticles (22) are bound to the inner surface of the vessel (26) by means of an external magnet (13),
 - the microparticles (22) are homogenised from the inner surface of the vessel (26) to the solution (23) by means of a magnet (13) of the magnetic tool (10) equipped with an
25 elastomer or a non-elastomer shield (21) or coating,
 - the microparticles (22) are transferred out from the vessel (26) to another vessel (26) by means of the magnetic tool (10).
4. A method according to claim 1, 2 or 3, c h a r a c t e r i s e d i n, that
- 30 - the microparticles (22) are bound on the surface of a shield (21) of a magnetic tool (10) equipped with an elastomer or a non-elastomer shield (21), or
 - the microparticles (22) are bound on the inner surface of a vessel (26) by means of an external magnet (13) during the whole procedure,
 - and the washing solutions (23) are changed in the same vessel (26) or in separate
35 vessels.

5. A method according to any of the claims 1-4, characterised in, that in the vessel (26) the solution or the solution, which contains magnetic particles or other microparticles (22) is mixed by means of a tool, such as magnetic tool (10) so that in the solution (23) the elastomeric membrane or bellows covering the tool is being stretched and released.

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6. A method according to any of the claims 1-5, characterised in, that

- the vessel (26) is closed while mixing the solution (23),
 - in the vessel (26) the solution (23) or the solution, which contains magnetic particles or other microparticles (22) is mixed by means of a tool, such as magnetic tool (10) so that
- 10 in the solution the elastomer membrane or bellows covering the tool the is being stretched and released.

7. A method according to any of the claims 1-6, characterised in, that

- in the solution (23) the microparticles (22) are bound on the inner surface of the vessel (26) by means of an external magnet (13),
- the microparticles (22) are homogenised to the solution (23) so that they are mixed by means of a tool by stretching and releasing elastomer membrane or bellows covering the tool,
- the washing solutions (23) are changed in the same vessel (26) or in separate vessels (26),
- the microparticles (22) are transferred out from the vessel (26) to another vessel by means of the magnetic tool (10).

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8. A method according to any of the claims 1-7, characterised in, that

- in the solution (23) the microparticles (22) are collected on the inner surface of the vessel (26) by means of an external magnet (13) having a ferromagnetic sleeve (12),
- the microparticles (22) are bound on the inner surface of the vessel (26) during the change of solutions (23).

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9. A method according to any of the claims 1-8, characterised in, that

- the microparticles (22) are collected on the inner surface of the vessel (26) by means of an external magnet (13) having a ferromagnetic sleeve (12),
- the microparticles (22) are bound on the inner surface of the vessel (26) during the change of solutions (23),
- the vessel (26) is closed by means of a protective membrane made of elastomeric material,

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- the microparticles (22) are homogenised to the solution (23) so that they are mixed by means of an elastomer membrane, a magnetic tool (10) or a pipette.
- the microparticles (22) are transferred out from the vessel (26) by means of the magnetic tool (10).

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10. A method according to any of the claims 1-9, characterised in, that

- the microparticles (22) are collected on a filter (77) on the bottom of the vessel (26) so that at least a part of the solution (23) is removed through the filter,
- the solution (23) is conducted through the filter (77) and the microparticles (22) on the filter,
- the microparticles (22) are collected on the shield (21) of the magnetic tool (10) transferred out from the vessel (26).

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11. A device for handling microparticles (22), which device includes at least one vessel (26), where the microparticles (22) are as the solid phase to bind the desired components from the sample, such as various biomolecules, Nucleic Acid, protein, peptide, cell organelles, bacteria, cells or viruses, characterised in that the device is provided with

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- a means for performing at least two treatment steps of the microparticles (22) or magnetic particles, such as ferromagnetic, paramagnetic or superparamagnetic particles in the same vessel (26) without removing the particles into another vessel,
- and a means for performing at least one change of solutions (23) and at least one mixing in the same vessel (26).

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12. A device according to claim 11, characterised in that the device is provided with

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- a magnetic tool (10) equipped with an elastomer shield (21) for collecting the microparticles (22) on the shield and for binding the microparticles during the change of solutions (23),
- and a mixing device, such as a magnetic tool (10) having an elastomer membrane, which is movable for mixing the microparticles (22).

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13. A device according to claim 11 or 12, characterised in that in the device

- the vessel (26) is provided with an external magnet (13) for binding the microparticles (22) to the inner surface of the vessel during the change of solutions (23),
- and the magnetic tool (10) is provided with a magnet (13) equipped with an elastomer shield (21), a non-elastomer shield or a coating for homogenising the microparticles (22) from the inner surface of the vessel (26) to the solution (23).

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14. A device according to claim 11, 12 or 13, characterised in that the device is provided with

- a magnetic tool (10) equipped with an elastomer or non-elastomer shield (21) for binding the microparticles (22) on the shield during the whole procedure, and/or
- 5 - an external magnet (13) for binding the microparticles (22) to the inner surface of the vessel (26) during the whole procedure,
- and a means for changing the solutions (23) in the same vessel (26) or in separate vessels.

10 15. A device according to any of the claims 11-14, characterised in that the device is provided with a mixing tool, such as the magnetic tool (10) with a magnet (13) having an elastomeric membrane or bellows covering the tool for mixing the microparticles (22).

15 16. A device according to any of the claims 11-15, characterised in that the device is provided with

- a vessel (26) for mixing the solution (23),
- and a mixing tool, such as the magnetic tool (10) with a magnet (13) and an elastomeric membrane or bellows for mixing the microparticles (22) by stretching and releasing the membrane or the bellows.

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17. A device according to any of the claims 11-16, characterised in that the device is provided with

- a vessel (26),
- a means for closing the vessel (26),
- 25 - and a mixing tool, such as the magnetic tool (10) with a magnet (13) and an elastomeric membrane or bellows for mixing the solution (23) by stretching and releasing the membrane or the bellows when the vessel (26) is closed.

30 18. A device according to any of the claims 11-17, characterised in that the device is provided with

- a vessel (26) having an external magnet (13) for binding the microparticles (22) in the solution (23) to the inner surface of the vessel,
- a mixing tool with a movable elastomeric membrane or bellows,
- a means for changing solutions (23) in the same vessel (26) or in separate vessels,
- 35 - and a magnetic tool (10) for transferring microparticles (22) from the vessel (26) to another vessel.

19. A device according to any of the claims 11-18, characterised in that the device is provided with a vessel (26) having an external magnet (13) provided with a ferromagnetic sleeve (12) for collecting and binding the microparticles (22) to the inner surface of the during the change of solutions (23).

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20. A device according to any of the claims 11-19, characterised in that the device is provided with

- an external magnet (13) provided with a ferromagnetic sleeve (12) for collecting and binding the microparticles (22) to the inner surface of the vessel (26) during the change of solutions (23),
- an elastomer protective membrane for closing the vessel (26),
- an elastomer membrane, a magnetic tool (10) or a pipette for homogenising the microparticles (22) to the solution (23),
- and a magnetic tool (10) for transferring the microparticles (22) out from the vessel (26).

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21. A device according to any of the claims 11-20, characterised in that the device is provided with

- a vessel (26),
- a filter (77) on the bottom of the vessel (26) for collecting the microparticles (22) in the solution (23) on the filter,
- a channel (85) on the bottom of the vessel (26) for conducting the solution (23) through the filter (77) out from the vessel,
- and a magnetic tool (10) having a shield (21) for collecting the microparticles (22) and for transferring the microparticles out from the vessel (26).

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